PATENT ABSTRACTS OF JAPAN

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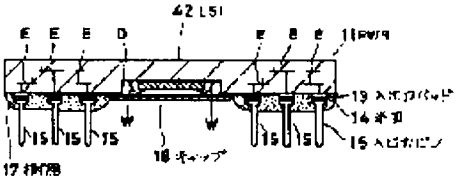
(71)Applicant : **NEC CORP**

(72)Inventor : **IKEDA HIRONOBU**
YAMAGUCHI YUKIO

(54) PIN GRID ARRAY



(57)Abstract:

PURPOSE: To obtain a pin grid array for fixing a large number of I/O pins to a printed wiring board(PWB) while increasing the wiring density of PWB.

CONSTITUTION: I/O pins 15 are fixed to I/O pads 13 on the lower surface of a PWB 11 and secured by means of a thermosetting resin 17. Since the I/O pin 15 can be fixed firmly to the PWB 11 without penetrating the PWB 11, wiring density of the PWB 11 can be increased and the number of I/O pins 15 can be increased regardless of the wiring density of PWB 11.

[Claim(s)]
[Claim 1]A pin grid array comprising:
An insulating substrate.
LSI provided on this insulating substrate.
An output pin by which the tip part is electrically connected with said LSI on the single-sided surface of said insulating substrate.
Heat-hardened type resin which covers an electric connection part of this output pin.

[Claim 2]The pin grid array according to claim 1, wherein temperature which said heat-hardened type resin hardens is lower than melting temperature of solder which electrically connects said LSI and said output pin.
[Claim 3]The pin grid array according to claim 1 or 2 having the reinforcing substrate by which a through hole wa s provided in said output pin and a corresponding position, inserting said output pin in a through hole of this reinforcing substrate, and fixing said reinforcing substrate to said insulating-substrate side.
[Claim 4]The pin grid array according to any one of claims 1 to 3 which provides said LSI in the output pin attachment side of said insulating substrate, provides a through hole of a byway in said LSI mounting part of said insulating substrate from said LSI, provides a heat sink which contacts this through hole with said LSI, and is characterized by things.
[Claim 5]The pin grid array according to any one of claims 1 to 4, wherein said LSI is closed by resin.
[Claim 6]The pin grid array according to any one of claims 1 to 4, wherein said LSI is closed with a cover material.

[Detailed Description of the Invention]
[0001]
[Industrial Application]Especially this invention relates to the pin grid array used for electronic information processing equipment about a pin grid array.
[0002]
[Description of the Prior Art]The pin grid array, especially the plastic pin grid array (henceforth P-PGA) using resin as construction material of an insulating substrate have been widely used from the cheap thing compared with the pin grid array which used the ceramic substrate etc. from before.
[0003]Drawing 6 is drawing of longitudinal section of an example of the conventional plastic pin grid array. The printed-circuit board (henceforth PWB) 41 according [this P-PGA] to resin, LSI42 provided in the cavity C of the center of the upper surface of this PWB41 by the wirebonding W, It becomes the through hole 50 of PWB41 from the output pin 45 by which insertion immobilization was carried out, and the cap 46 which closes this LSI42, and the output pin 45 is electrically connected to it via the wiring (un-illustrating) on LSI42 and PWB41.
[0004]Thus, it is because the intensity of PWB41 mainly fixes the output pin

45 firmly since it is low compared with a ceramic substrate etc. to have made PWB41 penetrate the output pin 45.
[0005]As a fixing method of the output pin 45 of PWB41, the output pin 45 is pressed fit in the through hole 50, and it fixes to it, or rice field attachment is performed in the second half of insertion, and the output pin 45 is fixed.
[0006]The chip carrier which has an input/output terminal which does not penetrate a substrate to a substrate as a pin grid array strengthened with ceramics at (1) JP,4-142766,A is indicated, (2) The multi chip package which brazed the input/output terminal in the substrate at JP,62-111456,A is indicated.
[0007]
[Problem(s) to be Solved by the Invention]However, a wiring area will be restricted by the through hole when wiring in the surface and inner layer of PWB, since the pin grid array using the conventional PWB is formed [only the number of output pins] for a through hole. For this reason, in order to raise wiring density, the number of output pins had to be reduced, and on the other hand, when the number of output pins was not able to be reduced, the number of layers of PWB had to be increased. However, the increase in a number of layers of PWB had the fault of bringing about a cost hike.
[0008]The advanced technology (1) cannot be related with the pin grid array which used the ceramic substrate with high intensity, and cannot adopt this output pin mounting arrangement as the pin grid array using PWB with intensity low as it is. The effect of having brazed the input/output terminal does not describe the advanced technology (2) concretely, and the effect is not certain. Thus, the art which attaches many output pins to the pin grid array using PWB with low intensity, and raises the wiring density of PWB to the advanced technology (1) and (2) is not indicated.
[0009]Then, the purpose of this invention is to provide the pin grid array which can attach many output pins to PWB, and can raise the wiring density of PWB.
[0010]
[Means for Solving the Problem]This invention is characterized by comprising the following, in order to solve said SUBJECT.
Insulating substrate.
LSI provided on this insulating substrate.
An output pin by which the tip part is electrically connected with said LSI on the single-sided surface of said insulating substrate.
Heat-hardened type resin which covers an electric connection part of this output pin.

[0011]
[Function]Since the output pin was attached on the surface of the insulating substrate, the wiring density of an insulating substrate can be raised and the number of an output pin can be increased irrespective of the wiring density of an insulating substrate. Since the electric connection part of the output

pin was covered with heat-hardened type resin, an output pin is firmly fixable to an insulating substrate.

[0012]

[Example]Hereafter, it explains, referring to an accompanying drawing for the example of this invention. In the following drawings, the same number is attached about the same component part as a conventional example, and the explanation is omitted.

[0013]Drawing 1 is drawing of longitudinal section of the 1st example of the pin grid array concerning this invention. The printed-circuit board (henceforth PWB) 11 according [the 1st example] to resin, LSI42 provided in the cavity D of the center of the undersurface of this PWB11 by the wirebonding W, The input output pad 13 which was electrically connected via the wiring E provided in the electric terminal (un-illustrating) of this LSI42, the surface of PWB11, or the inner layer, and was provided in the undersurface of PWB11, It consists of this input output pad 13, the output pin 15 to which that tip part is soldered with the solder 14, the cap 16 which adheres to PWB11 with adhesives etc. in order to close LSI42, and the heat-hardened type resin 17 for fixing the output pin 15 to PWB11 firmly.

[0014]Plating of material with solder NURE nature sufficient [the surface of the input output pad 13 and the soldering part of the output pin 15], for example, Au, Cu, etc. is performed. When Sn/Pb (63 / 37wt percent) eutectic solder etc. are used as the solder 14, soldering of the input output pad 13 and the output pin 15 can be performed by a 210 ** heating reflow etc.

[0015]Heat-hardened type epoxy system resin is preferred as the heat-hardened type resin 17, the heat-hardened type resin 17 after completing soldering of the input output pad 13 and the output pin 15 is applied to a soldering part, and it heats, and is made to harden. By setting the cooking temperature at this time as a temperature lower than the melting temperature of the solder 14, the solder 14 cannot fuse but it can prevent the output pin's 15 causing a position gap, or falling.

[0016]When it mounts the plastic pin grid array (henceforth P-PGA) completed in this way to mother boards, such as another PWB, mounting which uses a solder material of the same kind by being satisfactory even if it fuses, since it is being covered and fixed with the heat-hardened type resin 17 is possible for the solder 14.

[0017]When LSI42 does not need to be closed, it is not necessary to attach the cap 16.

[0018]Next, P-PGA of the 2nd example is explained. Drawing of longitudinal section of the 2nd example of the pin grid array which requires drawing 2 for this invention, and drawing 3 are drawings of longitudinal section of the substrate with a pin of the 2nd example. The same number is attached about the same component part as the 1st example, and the explanation is omitted.

[0019]The point that P-PGA of the 2nd example differs from the 1st example is having attached the reinforcing substrate 28 to the output pin 15.

[0020]The substrate 29 with a pin becomes drawing 3 from the input output

pad 13 of PWB11, the reinforcing substrate 28 which formed the through hole 30 in the corresponding position, and the output pin 15 pressed fit and fixed to this through hole 30 so that it may be shown.

[0021]And alignment is performed so that it may lap with the input output pad 13 of PWB11, as shown [upper bed / of the output pin 15 of this substrate 29 with a pin] in drawing 2, and it electrically connects with the solder 14. As the method of soldering, cream solder is beforehand carried on the input output pad 13, When the output pin 15 is piled up and Sn/Pb (63 / 37wt percent) eutectic solder etc. are used as the heating reflow 14, for example, solder, in this state on cream solder, the input output pad 13 and the output pin 15 are electrically connected by performing a 210 ** heating reflow etc. Plating of a good material of solder NURE nature, for example, Au, Cu, etc. is performed like [the soldering part of the output pin 15] the surface of the input output pad 13.

[0022]And the heat-hardened type resin 17 is slushed into the soldering part of the crevice between PWB11 and the reinforcing substrate 28 after completing soldering, and it is made to harden with heating etc. Like the 1st example, heat-hardened type epoxy system resin of the heat-hardened type resin 17 is preferred, by setting the cooking temperature at this time as a temperature lower than the melting temperature of the solder 14, the solder 14 cannot fuse it but it can prevent the output pin 15 causing a position gap.

[0023]When it mounts P-PGA completed in this way to mother boards, such as another PWB, mounting which uses a solder material of the same kind by being satisfactory even if it fuses, since it is being covered and fixed with the heat-hardened type resin 17 is possible for the solder 14.

[0024]Thus, PWB11 and the output pin 15 can be reinforced by attaching the reinforcing substrate 28 to PWB11.

[0025]Next, P-PGA of the 3rd example is explained. Drawing 4 is drawing of longitudinal section of the 3rd example of the pin grid array concerning this invention. The same number is attached about the same component part as the 1st example and the 2nd example, and the explanation is omitted.

[0026]The point that P-PGA of the 3rd example differs from the 1st example is having attached the heat sink to LSI42.

[0027]As shown in drawing 4, P-PGA of the 3rd example consists of PWB35 which formed the through hole 36 of the byway in the LSI42 mounting part of PWB11 of the 1st example from LSI42, and the heat sink 37 which this through hole 36 was made to contact LSI42, and was provided in it. It is preferred to use aluminum, a Fe/nickel (42/58) alloy, etc. as construction material of this heat sink 37. The heat radiating ability of LSI42 can be raised by forming this heat sink 37.

[0028]Next, P-PGA of the 4th example is explained. Drawing 5 is drawing of longitudinal section of the 4th example of the pin grid array concerning this invention. The same number is attached about the same component part as the 1st - the 3rd example, and the explanation is omitted.

[0029]The point that P-PGA of the 4th example differs from the 1st example

is closed by the resin 38 instead of closing LSI42 with the cap 16. It is preferred to use the heat-hardened type resin 17 and the same resin as the resin 38.

[0030]It is also possible to use the reinforcing substrate 28 of the 2nd example for P-PGA of the 3rd or 4th example. Although the resin substrate was used as an insulating substrate in P-PGA of the 1st - the 4th example, it is also possible not to limit to this and to use a ceramic substrate etc., for example.

[0031]

[Effect of the Invention]Since according to this invention the output pin electrically connected with LSI was provided in the single-sided surface of the insulating substrate and this output pin was fixed by heat-hardened type resin, Raising the wiring density of an insulating substrate, increasing the number of an output pin irrespective of the wiring density of an insulating substrate, and an output pin are firmly fixable to an insulating substrate.

[Brief Description of the Drawings]

[Drawing 1]It is drawing of longitudinal section of the 1st example of the pin grid array concerning this invention.

[Drawing 2]It is drawing of longitudinal section of the 2nd example of the pin grid array.

[Drawing 3]It is drawing of longitudinal section of the substrate with a pin of the 2nd example of the pin grid array.

[Drawing 4]It is drawing of longitudinal section of the 3rd example of the pin grid array.

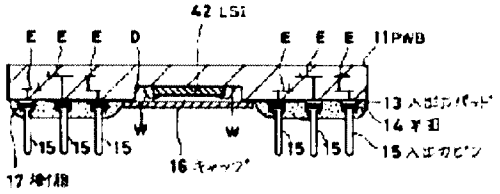
[Drawing 5]It is drawing of longitudinal section of the 4th example of the pin grid array.

[Drawing 6]It is drawing of longitudinal section of an example of the conventional plastic pin grid array.

[Description of Notations]

11 Printed-circuit board
14 Solder
15 Output pin
16 Cap
17 Heat-hardened type resin 17
28 Reinforcing substrate
30 and 36 Through hole
37 Heat sink
38 Sealing resin
42 LSI

【図１】



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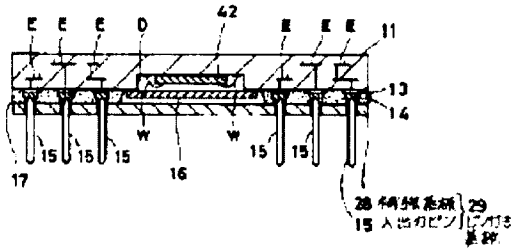

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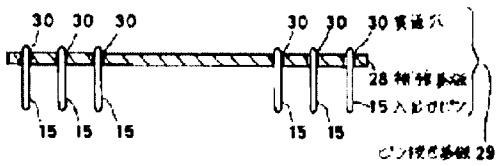

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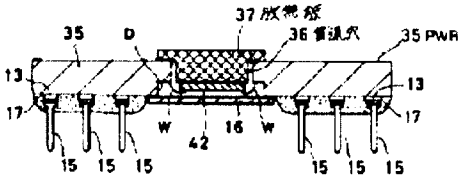

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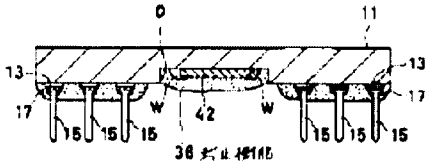

【図６】